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A review of GPO operations and management included an examination of procedures for determining contract work, production planning and scheduling, labor productivity, and controls over materials spoilage. Findings/Conclusions: Although regulations require work that is not under urgent time schedules to be commercially procured, some work was unnecessarily printed in-house because of erroneous information on procurement capability or processing schedules. Production schedules were sometimes unrealistic because of lack of feedback systems or inaccurate information. Labor productivity indexes were still being developed and labor standards did not cover all operations. Controls and reporting systems related to spoilage needed improvement. Recommendations: The Government Printing Office needs to: establish coordination between the Customer Service Department and the Printing Procurement Department on timing for procurement and commercial availability of certain items; improve information related to production plans and backlog levels; and increase coverage and update standards applied to labor operations. (HTW)

# *REPORT TO THE CONGRESS*



*BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES*

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## **Government Printing Office Production And Management Controls--Improvement Opportunities**

The Government Printing Office needs to improve its

- procedure for deciding whether to contract for printing or to do it in-house,
- planning and scheduling of production,
- productivity controls, and
- controls over spoiled material.



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

B-114829

To the President of the Senate and the  
Speaker of the House of Representatives

This report points out how the Government Printing Office can improve its management of in-house printing.

We made this review as a part of our ongoing efforts to audit the major Printing Office operations. Previously, we reviewed the management of the Printing Office's procurement of printing and of the Superintendent of Documents' operation. We made this review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Chairman, Joint Committee on Printing; the Public Printer; and the Chairman, Subcommittee on Legislative, Senate Committee on Appropriations.

*Thomas A. Altsch*  
Comptroller General  
of the United States

COMPTROLLER GENERAL'S  
REPORT TO THE CONGRESS

GOVERNMENT PRINTING OFFICE  
PRODUCTION AND MANAGEMENT  
CONTROLS--IMPROVEMENT  
OPPORTUNITIES

D I G E S T

The Government Printing Office, which does most Government printing, binding, and blankbook work, needs to improve its

- management controls for in-house production,
- procedures for deciding whether to contract work out or to do it in-house,
- production planning and scheduling,
- labor productivity, and
- controls over spoiled material.

The Government Printing Office's central office spent about \$273 million for printing and binding services from commercial printers and another \$124 million for printing done in-house in fiscal year 1975. About 55 percent of the in-house printing is done for the Congress and 45 percent is for executive agencies.

DETERMINING WHETHER TO PRINT  
IN-HOUSE OR CONTRACT OUT

The Federal printing procurement program, established by the Joint Committee on Printing, is designed to increase the amount of commercially procured printing. Committee regulations state that Government printing plants shall not print items determined to be commercially procurable.

The Printing Office's Customer Service Department examines all incoming orders to determine if the work can be done commercially. Most congressional orders are printed in-house because of their urgency. Executive agency orders are generally less urgent and can often be done by a commercial contractor.

Agency orders are printed in-house because (1) the work is needed more quickly than commercial printers can normally produce it, (2) the work is needed to help balance fluctuations of in-house production, and (3) the work, such as that containing classified information, must be carefully accounted for.

Some executive agency work was unnecessarily printed in-house. Certain types of printing were incorrectly identified as not commercially procurable, and erroneous information on in-plant processing schedules was used, incorrectly causing work to be kept in-house. (See p. 8.)

#### PRODUCTION PLANNING AND SCHEDULING

The Printing Office tries to minimize the cost of production and to meet customer needs on a timely basis. To do this, incoming workload is analyzed, plans are made, and schedules are established to make sure that production resources are used efficiently and that work is completed within a reasonable time.

The Printing Office plans the operations to be used on each nonrush order by determining the least costly sequence of operations. After a plan is developed, schedules are established to show when the work will enter each operation, based on backlog levels in each operation. But, the Printing Office has no system to feed back information showing how actual production compared to planned production. Such information could identify the operations that continually cause plan changes and the reasons for such changes. (See p. 12.)

Further, the accuracy of feedback information on production backlogs needs to be improved. With more accurate information, realistic schedules could be established. Many of the agencies' delivery dates were not met during the January 1976 period tested by GAO. (See p. 13.)

## LABOR PRODUCTIVITY

Productivity indexes and labor standards are controls for achieving efficient use of labor. The use of productivity indexes is still in the development stage, but labor standards are an established management tool.

To control efficiency, labor standards should cover all important operations. Standards should be established after determining the best work methods and after using an accurate measurement technique. Efficiency is assessed by accurately reporting performance and comparing it to the standards.

The Printing Office could improve its labor standards program by increasing the number of operations covered by standards, by changing the methods of computing standards, and by recording actual performance against standards. (See p. 18.)

## CONTROLS OVER MATERIAL

Spoilage is an inherent part of printing because a certain amount of paper is wasted in setting up and operating presses and bindery equipment. Spoilage above expected levels should be closely evaluated to determine the causes. The Printing Office could better use reports to identify the causes of spoilage. (See p. 24.)

## RECOMMENDATIONS

The Public Printer should see that Customer Service personnel are provided better information for deciding whether to arrange for commercial printing by

--establishing a procedure by which the Customer Service Department coordinates with the Printing Procurement Department on the number of days required to procure various types of printing and the types of printing that can be procured, such as letterheads and specialty items, and

--more accurately reporting backlog levels in the production sections. (See p. 10.)

The Public Printer should take action to improve the information used for production planners and schedulers by directing that

--information relating to changes in production plans be maintained and used by the Production and Customer Service Departments for directing management action and

--workload scheduling be improved by assuring that factors used in computing backlog levels are examined and adjusted so that reported backlog levels approximate the time required to process orders through the production system and that the reported backlog levels are used as the primary information for scheduling orders. (See p. 15.)

The Public Printer should increase the coverage of important operations under standards, improve the quality of the standards, and assure the accuracy of production output reporting by

--extending the same proofreading standards to all proofreaders,

--analyzing work methods before establishing standards,

--eliminating the practice of updating standards based solely on continually changing historical experience, and

--making sure that all production work is correctly counted. (See p. 22.)

The report was discussed with the Deputy Public Printer and other Government Printing Office representatives. They expressed no disagreement with the major findings in the report. Changes were made where appropriate to reflect their comments. (See pp. 10, 16, 23, and 26.)

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**ABBREVIATIONS**

<b>GAO</b>	<b>General Accounting Office</b>
<b>GPO</b>	<b>Government Printing Office</b>
<b>GSA</b>	<b>General Services Administration</b>
<b>JCP</b>	<b>Joint Committee on Printing</b>
<b>PIA</b>	<b>Printing Industries of America</b>

## CHAPTER 1

### INTRODUCTION

According to 44 U.S.C. 501 all Government printing, binding, and blankbook work, except for that of the Supreme Court of the United States, must be done at the Government Printing Office (GPO), unless otherwise stated by the Joint Committee on Printing (JCP). However, title 44 also allows the commercial procurement of printing which cannot be accomplished at GPO, and the Printing and Binding Regulations published by JCP state that Government printing plants shall not print items determined to be commercially procurable. The Federal printing procurement program, established by JCP, is designed to increase the amount of commercially procured printing.

In fiscal year 1975 GPO billed customers about \$456 million for printing and binding services. Of this about \$273 million was for commercially procured printing and binding, \$24 million for blank paper, and \$159 million for in-house printing and binding. The central office produced \$124 million of the in-house printing.

GPO's central office printing consists of about 55 percent congressional and 45 percent executive agency work, and is produced in a complex of buildings on North Capitol Street, Washington, D.C. Appendix I further describes this workload.

### SCOPE OF REVIEW

We made this review at GPO's central office. We also obtained information on procurement of printing from GPO's Regional Printing Procurement Office #3 at the Washington Navy Yard.

We reviewed GPO's methods of deciding whether to contract work out or to do it in-house. We also examined its planning and scheduling controls, productivity controls, and materials spoilage controls.

## CHAPTER 2

### HOW THE GOVERNMENT PRINTING OFFICE CONTROLS

#### ITS PRODUCTION OPERATION

Management controls are used to assure that operational objectives are achieved. In the Government Printing Office production operation, the key objectives are to provide timely and efficient printing service to the Congress and the executive agencies. To do this GPO uses management controls to (1) analyze incoming orders to insure that the workload does not contain commercially procurable printing (also known as make-or-buy decisions), (2) plan and schedule the orders through in-house production operations so that the proper operations are done at the designated time, (3) insure that the labor force is productively used, and (4) record and evaluate excessive loss of material during the production process.

#### ANALYZING INCOMING ORDERS

The Joint Committee on Printing's printing and binding regulations, reflecting the Federal printing procurement program's intent to increase commercial procurement, state that only printing that is not commercially procurable may be produced in Government plants. An exception to these regulations is permitted when the plant workload fluctuates and the in-house retention of commercially procurable work will balance this workload.

Those orders which cannot be obtained from private contractors generally fall into the following categories:

- Orders needed more quickly than commercial printers can normally deliver.
- Highly specialized work that only a particular Government plant can do or that contractors will not bid on.
- Orders requiring accountability, such as classified information.

GPO's primary mission is to satisfy the printing requirements of the Congress and the urgent needs of executive agencies and the judiciary. To meet this mission, GPO tries to maintain a level of workload necessary to insure efficient use of the production capacity.

Most congressional printing is required in a short time frame; consequently, GPO prints most congressional orders in-house. Congressional workload is also cyclic. Shortly after each session of Congress opens, a large number of bills are introduced, raising GPO's workload. This period is followed by a few weeks of lower congressional printing and then a gradual increase as appropriation hearings progress. By mid-April congressional workload input reaches its peak and begins to drop. Congressional recesses are also periods of lower congressional workload, although congressional staffs continue to require printing. For example, many hearings are held during recesses. During periods of lower congressional workload, GPO retains more executive agency orders, usually procured commercially, to balance its total workload level.

In addition, congressional workload may fluctuate widely from day to day, especially in printing the Congressional Record, which varies from about 64 to 450 pages.

Executive agency orders, which constitute about 45 percent of the in-house work, include some orders which require accountability, primarily patents, postal cards, and passports, which accounted for about 16 percent of the fiscal year 1975 executive agency workload.

### PRODUCTION PLANNING AND SCHEDULING

Before work is performed on printing orders, consideration must be given to the efficient use of production resources and the timely completion of orders.

GPO's primary objectives of planning and scheduling are to minimize the cost of using the production facilities and to meet customer needs on a timely basis.

#### Planning

Planning involves examining the orders and determining the best and least costly operations to be used. GPO's sequence of operations is normally (1) composing or platemaking--such as setting of type or making a printing plate, (2) printing--on either a letterpress or offset press, and (3) binding--such as making printed sheets into books or pamphlets.

For each operation in the sequence, an order for printing can be performed in a number of ways and on various equipment, and planning is required to determine the least costly set of methods and equipment to be used. For example, a

certain printing press may be the least expensive for printing a particular order; however, the printed sheet from that press may not be compatible with the least expensive binding equipment. Consequently, the costs of alternative printing methods are considered to determine the least expensive series of operations. Therefore, any change to the planned operations may increase the production costs.

### Scheduling

Scheduling is accomplished by determining for each order the needed delivery date, the operations that must be performed, the length of time in each operation, and the work backlog in each operation. The operations are then scheduled based on production time available in each operation and the needed delivery date.

Scheduling requires a reporting system which continually identifies the backlog in any operation. GPO has a daily report which identifies major sections, machine groups, and the number of days of backlog at each.

### Management reporting

After an order is planned, scheduled, and placed in production, management must control the order to insure that planning and scheduling objectives are met. GPO uses a management-by-exception approach to insure the production plan is followed. If the plan is not followed, a production section submits a production change request. GPO also uses a daily progress reporting system to insure that the production schedule is followed. If an order is found to be behind schedule, it is highlighted by a report and management is expected to give the order special attention.

GPO is trying to develop a computerized information system--the Operations Management Information System. This System, which is planned to be operational in 2 years, will be developed, in part, to provide timely information on the production status of orders and improved accuracy of scheduling. However, this System is still being developed.

### LABOR PRODUCTIVITY

GPO uses productivity indexes and labor standards as controls for achieving efficient use of labor. These controls perform complementary functions.

## Productivity index

Productivity indexes are measures of the final physical output of an entire organization (or component) divided by the manpower used by that organization. These indexes are compared to prior years' to measure the trend in productivity for an entire organization. Overall productivity indexes describe the trend of productivity, including all parts of the labor force; however, these trends are too general to provide information on specific problem areas.

## Labor standards

Labor standards are measures of the expected output an hour for specific operations. These standards are used to measure the performance of operations on which single workers or groups of workers may be assigned. Standards for machine controlled operations are given in terms of machine output rather than staff output.

Labor standards are used in measuring performance in specific operations, but may not cover all individual operations such as material handling. Therefore, labor standards generally are not useful for describing an organization's overall productivity. For example, the efficiency of workers performing specific individual operations may be good, while at the same time the amount of time actually spent on these operations may be declining and time spent in a delayed status may be increasing, resulting in an overall productivity drop. Only by using an overall productivity index would the effect on the total organization be detected.

Labor standards development in industry is generally done in two steps. First, the methods of operation are evaluated and improved, if possible. Second, the time in which the operation can be performed is determined. This approach results in what is often referred to as "engineered standards."

The purpose of performing a methods study is to insure that unnecessary steps are excluded from the operation and that each step is performed in the best manner. After a methods study is performed, a record of the established methods serves as a reference if a decrease in output occurs and as a tool for performing methods improvement work.

## IN-PROCESS MATERIAL CONTROL

Spoilage of material, caused by either man or machine, occurs during printing. Spoilage cost is computed as the cost for materials, labor, and overhead that were necessary to correct errors incurred during production.

At GPO, material is issued from storage to press sections in response to a request for each order. Accountability over material loss while the material is being processed is provided by spoilage reports. To control spoilage, these reports are designed to identify where the spoilage occurred and the cause. Spoilage reports are also used for reordering more material to complete the order.

\* \* \* \* \*

GPO has established controls to insure an efficient production operation. The specific problems in these controls are discussed in the following chapters.

## CHAPTER 3

### IMPROVING THE MAKE-OR-BUY DECISION

The Joint Committee on Printing's printing and binding regulations, reflecting the Federal printing procurement program's intent to increase commercial procurement, state that only printing that is not commercially procurable may be produced in Government plants. However, JCP guidelines allow Government printing plants to perform a minimal level of commercial work to balance fluctuating workloads.

When an order is received at GPO, the Customer Service Department decides whether to print the order in-house or to procure it from commercial printers.

#### MAKE-OR-BUY DECISION

The Customer Service Department, to implement the program to maximize commercial procurement of printing, has adopted a set of criteria which address required turnaround time, in-house workload balancing needs, costs, and commercial availability of certain orders.

The Customer Service Department considers all requisitioned printing work as commercially procurable except

- most congressional orders,
- "riders" on orders already being printed in GPO,
- certain reprints of previous orders where reproducible printing media (such as electrotypes plates) are in storage,
- certain envelopes or letterheads,
- orders which require completion faster than can be done commercially,
- orders which can use discontinued paper or paper requiring color matching,
- preprogramed orders which must be produced on a specified date,
- items requiring accountability, such as passports and postal cards,

- orders requiring specialized capabilities, and
- work required to balance in-house workload.

Customers designate on printing requisitions the dates the orders are needed. Congressional orders are normally requested to be completed in a few days. The Customer Service Department maintains continuous contact with congressional printing clerks and attempts to insure that unneeded turnaround times are not requested; however, according to these printing clerks, congressional needs are generally urgent and connected with scheduled business. In addition, the Congressional Record and the Federal Register, which together constitute a significant proportion of the congressional workload, are required to be printed in 1 day or less. Consequently, most congressional orders must be printed in-house, and only a small proportion of the congressional work is commercially procured.

Agencies' orders may not always be required as quickly and, therefore, have greater potential for being commercially procured. The orders are examined and compared with the preceding criteria. GPO's management expects the individual who makes this decision to be knowledgeable in the commercial availability of various types of printing, the time required to purchase printing, the workload levels in the major parts of GPO's production process, and the management policies of retaining work in-house. No formal written procedure or guidance is provided for making these decisions, but rather the responsible individual is expected to have expertise in many printing areas and to keep in contact with GPO's Printing Procurement Department to supplement his knowledge regarding procurement. He is also given a daily written report on production backlogs.

We examined selected executive agency orders which were kept in-house for reasons other than to balance workload fluctuation or for accountability. We found that certain orders could have been procured from commercial printers.

#### Short turnaround times

Ten orders were kept in-house because of short turnaround requirements. A later examination by GPO procurement officials, at our request, revealed that six of the orders could have been procured within the requested time. The individual who made the decision said that he does not have up-to-date data on the time it takes to procure various types of work.

Further, Customer Service officials said that production backlog information used to estimate in-house processing times is not always correct when the order reaches the specific equipment. During 1 week backlog levels in the Offset Division were reported at 9.5 days or less, but the average order required 17.4 days to process through the division. The reported backlog of 9.5 days was understated because certain presses were down for maintenance and this was not considered in the computation of the reported backlog. (See p. 14 for explanation of backlog computations.)

### Letterheads and specialty items

Ten orders were held in-house because they were for letterheads. These decisions were inadvertently made because Customer Service personnel believed that contractors could not provide the needed quality. However, many contractors are capable of the high quality work required. GPO officials agreed that commercial printers could have provided the required quality.

Fourteen orders were kept in-house because Customer Service personnel believed these orders were impractical for contractors for reasons such as making only negatives or reproducible. No guidelines are provided for these types of orders and the individual making the decision relies on his judgment and experience. Procurement Department officials reviewed those orders to see if contractors on their bid lists could practically handle the work. Procurement officials identified seven jobs which could have been procured with little difficulty.

### CONCLUSIONS

GPO is retaining some executive agency orders in-house which should be commercially procured.

Customer Service Department personnel, who perform the make-or-buy decisions, are neither obtaining correct data on procurement times for various types of printing, nor receiving correct data on processing times within GPO.

A Customer Service individual was also retaining in-house various items which he believed were unavailable from commercial sources, but were judged to be commercially procurable by GPO's Procurement Department.

## RECOMMENDATIONS

The Public Printer should see that Customer Service personnel are provided better information for deciding whether to arrange for commercial printing by

- establishing a procedure by which the Customer Service Department coordinates with the Printing Procurement Department on the number of days required to procure various types of printing and the types of printing that can be procured, such as letterheads and specialty items, and
- more accurate reporting of backlog levels in the production sections.

## AGENCY COMMENTS AND OUR EVALUATION

We obtained comments from the Deputy Public Printer and other Government Printing Office representatives. They expressed no disagreement with the major findings in the report. The Deputy Public Printer stated better communication is needed between Procurement and Customer Service. He also said that GPO will explore the various means of improving this communication, possibly through closer liaison between the Customer Service decisionmaker, the Production Manager, and Printing Procurement personnel. He also said that the Operations Management Information System, which is planned to be fully operational in about 2 years, will improve production backlog information.

We believe GPO's proposed action to improve the information used by the Customer Service decisionmaker will satisfy the intent of our recommendations.

## CHAPTER 4

### PRODUCTION PLANNING AND SCHEDULING

Planning and scheduling workload are necessary to assure the efficient use of production resources and the timely completion of orders. GPO's management objectives for planning and scheduling are to minimize the cost of using the production facilities and to meet customer needs on a timely basis.

Planning is the process of determining the operations and equipment required to accomplish each printing order. GPO has a variety of equipment capable of performing each operation, and planners must select the equipment which will result in producing the orders at the lowest costs within the time constraints applicable to the order.

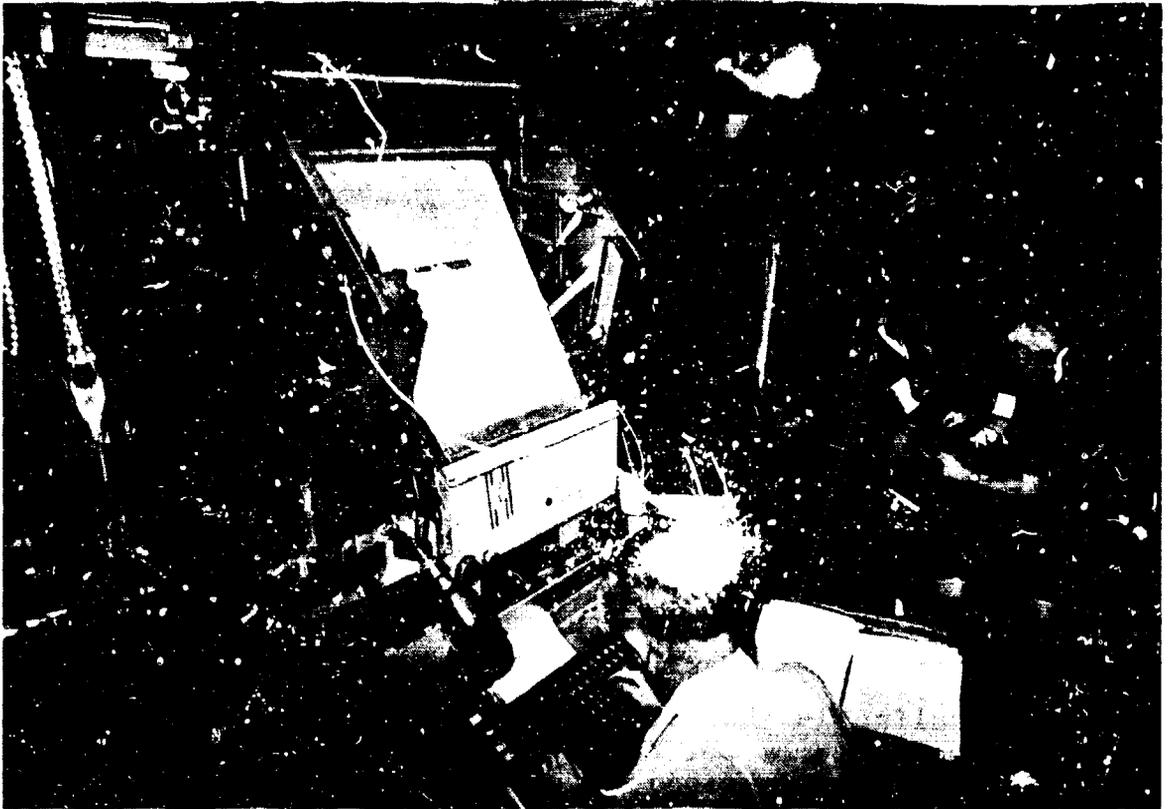
Scheduling is the process of establishing the dates that each process must be performed so that the order is delivered to the customer when promised.

### COORDINATING CONGRESSIONAL AND EXECUTIVE BRANCH WORKLOADS

Congressional orders are placed into production within a few hours of their receipt in GPO, and almost all orders are processed in less than 8 days and many overnight. Higher priority congressional work has resulted in revisions to production plans developed for agency workload. GPO estimates that in fiscal year 1975, nearly \$1 million was added to planned production costs because of production changes required to accommodate priority work. The records of 23 agency orders which were completed late showed that 10 were either removed from the presses or did not start on schedule because of more urgent congressional work. One order had been removed from production and restarted 15 times.

According to several congressional printing clerks and the House and Senate Bill Clerks, the requested completion dates are selected to coincide with the needs of the Congress and later dates could not be allowed.

In planning and scheduling actions, GPO attempts to compensate for the congressional priorities by reserving a certain portion of the equipment capacity for congressional workload. The remaining unreserved capacity is considered available for agency work. While this adjustment is performed to compensate for long-term fluctuations in congressional workload



Journeymen operators at keyboards of 4 of 171 linotype machines in the Composing Division. They are setting type for overnight delivery of the Congressional Record, various bills, and reports.

and gives agency workload some dedicated equipment for planning purposes, it does not accommodate daily fluctuations; on occasions, all of the unreserved equipment may be used for congressional workload.

### PLANNING

Production planning entails determining the best method for processing an order, communicating this plan to the production sections, monitoring to insure adherence to the plan, reporting, evaluating and approving or disapproving changes to the plan, and updating planning information based on reported changes in the production process.

After an order is selected for in-house production, the Customer Service Department plans the method of producing the order. To select the operations, GPO planners consider the number of pages, length of run, type of paper stock, illustrations, and colors required. Based on these requirements, the planners identify the least expensive methods and equipment to be used, and compute the cost for that plan. If more than one plan appears logical, a planner computes the cost of each

and selects the lowest. Unless the order is requested to be expedited or changed by the agency, the planned cost plus transportation costs is the price charged to the customer agency. After all cost elements are computed, the production plan is recorded on a working jacket.

The working jackets are sent to a production scheduler and then to the first scheduled production section. GPO management requires the plans be followed unless a production section requests a change.

#### Management information could be obtained from production change requests

According to production management officials, changes to the plans are generally requested to meet short turnaround schedules, to balance workload between machines, and to move an order from a machine which is having quality or running problems.

When a production supervisor determines that sufficient reason exists for changing a production plan, he submits to the Production Manager's office a "Request for Change In Production Method Indicated on Jacket." An individual in the Production Manager's office examines the request and recommends that the Manager or his Deputy approve or disapprove the change.

After approval of production plan changes, the Production Manager's copies are disposed of. Further, no compilation of changes nor their causes is prepared and no management report is developed. Consequently, management is not informed of either possible recurring but correctable problems or cost saving changes that should be incorporated.

#### SCHEDULING

Scheduling is accomplished by determining for each order the needed delivery date, the operation that must be performed, the length of time required by each operation, and the work backlog in each operation. The operations to be used are then scheduled based on production time available in each operation and the order's requested delivery date.

To schedule completion dates for processing orders through various operations, the Customer Service Department schedulers use an experience-based criteria for most orders; more complex orders are given more time than normal orders. In addition, the schedulers receive a daily report containing the backlog levels at each major operation. These backlog levels when added to the time required for each operation are also used to estimate processing time.

After the orders have been placed in production, their progress is monitored using a plantwide data transmission system. Each move of an order is reported to a central production monitoring section in the Production Manager's office. If an order is found to be behind schedule, it is highlighted by a daily report, and management is expected to give the order special attention.

### Executive order delays

We examined 172 executive agency orders received and scheduled during the week of January 26, 1976, to determine the effectiveness of GPO's scheduling system and found that about 63 percent of these orders were not delivered on time. The average order was scheduled for completion in 16.3 days and was actually completed in 19.4 days. In a few instances GPO filled partial orders, prior to filling the entire order, to meet agencies' needs.

The experience-based criteria and the methods of computing backlogs in the Offset Division were examined because the Customer Service personnel considered this division one of the most important to schedule properly. We found that the information used for scheduling this division was not accurate.

### Better scheduling information needed

The schedulers' criteria for average processing times does not reflect actual processing times. Further, the daily report of backlog levels, which should provide a more accurate measure of current processing time, does not reflect actual backlog levels. The following table, based on a sample of 92 orders taken during the week of January 26, 1976, demonstrates the difference between the average scheduled processing time and the weighted actual processing time in the Offset Division. The average scheduled and actual processing times include times for both normal and more complex time-consuming orders.

	<u>Days</u>
Average scheduled processing time	12.6
Average actual processing time	17.4

### Computation of reported backlogs

The number of backlog days is computed by dividing the estimate of press hours required on all backlogged orders by

the number of press hours available each day. An error was incorporated into the computation because GPO did not reduce the press availability by the quantity of presses not in operation, for reasons such as maintenance. As a result, during the week of January 26, 1976, the available number of group 85 presses available for agency work was overstated by 38 percent, causing the reported backlog to be understated by over 3 days.

The Customer Service Department and Production Department officials acknowledged that the backlog reporting system can be improved. These officials stated that production foremen informally communicated with Customer Service to tell them of low backlogs and of the need for including more balancing workload. Such a system, operating without specific guidelines, may contribute to overloading, and consequently, schedule delays.

### CONCLUSIONS

Records and reports are not maintained on the overall extent or causes of changes to production plans, and management is not informed of the total costs of changes to plans. Without such information, management is not always able to identify problems causing changes to the plan to take appropriate action.

The accuracy of the criteria used for scheduling and the backlog information supplied to planners and schedulers through the daily report of backlogs could be improved. As a result, GPO should be able to establish schedules which can be met so that agencies can receive orders as scheduled.

### RECOMMENDATIONS

The Public Printer should take action to improve the information used for production planners and schedulers by directing that

- information relating to changes in production plans be maintained and used by the Production and Customer Service Departments for directing management action and
- workload scheduling be improved by assuring that factors used in computing backlog levels are examined and adjusted so that reported backlog levels approximate the time required to process orders through the production system, and that the reported backlog levels are used as the primary information for scheduling orders.

## **AGENCY COMMENTS AND OUR EVALUATION**

The Deputy Public Printer agreed with our recommendations. He said that causes indicated on change requests will be analyzed periodically and considered in future production planning. He further indicated that the backlog level information will be more accurate and timely under the Operations Management Information System.

We believe the planned analysis of reasons for production changes will help identify problems that are affecting production plans and that the more accurate backlog data available from the System will aid workload scheduling.

## CHAPTER 5

### PRODUCTIVITY CONTROLS

Productivity controls are established to achieve efficient use of labor. GPO has recently assigned the responsibility for both overall productivity indexes and labor standards to the Financial Management Service, Productivity and Work Measurement Division. This responsibility was previously shared with the Rates and Investigations Division. Overall productivity indexes have only recently been installed as a management tool; however, GPO has a long history of using labor standards.

#### ESTABLISHING LABOR STANDARDS

Effective labor standards systems require (1) adequate standards coverage of the most important operations, (2) standards developed using methods analysis in conjunction with an appropriate measurement technique, and (3) accurate reporting of actual performance against the standards.

Adequate standards coverage requires that management examine the various operations and undertake the establishment of standards where benefits outweigh the cost of standards. Complete coverage may not be desirable because standards for minor or difficult-to-measure tasks may require more cost and effort than the tasks merit.

Methods analysis is the process of examining the task to be performed and determining the best method of performing the task. Methods analysis is generally performed before measuring the task. To do otherwise would result in incorporating inefficiencies into the standards.

Measurement techniques vary depending on the preciseness of measurement desired. Highly repetitive tasks are generally measured by time studies or predetermined time systems. Tasks which are not highly repetitive are often measured using historical records of output and time spent. Regardless of the measurement technique used, once the standard is established, changes to the standard are normally not required unless the method of performing the task changes.

Reporting actual performance to management requires correct reporting of production outputs and hours spent for each operation. Normally, an effective work measurement system insures correct reporting of data by obtaining actual production outputs from the organization's production reporting system and actual hours from the time accounting system.

## GPO'S LABOR STANDARDS SYSTEM

GPO's labor standards are developed by using measures obtained from (1) historical performance, (2) managerial judgment, and (3) Civil Service Commission hiring requirements. These standards cover about 60 percent of all production labor hours.

Monthly reports are produced which portray labor performance to varying degrees of refinement. In the Composing Division, performance is reported for individual composing machine operators and proofreaders, whereas, in the other divisions performance is generally reported by operation and may involve a number of workers.

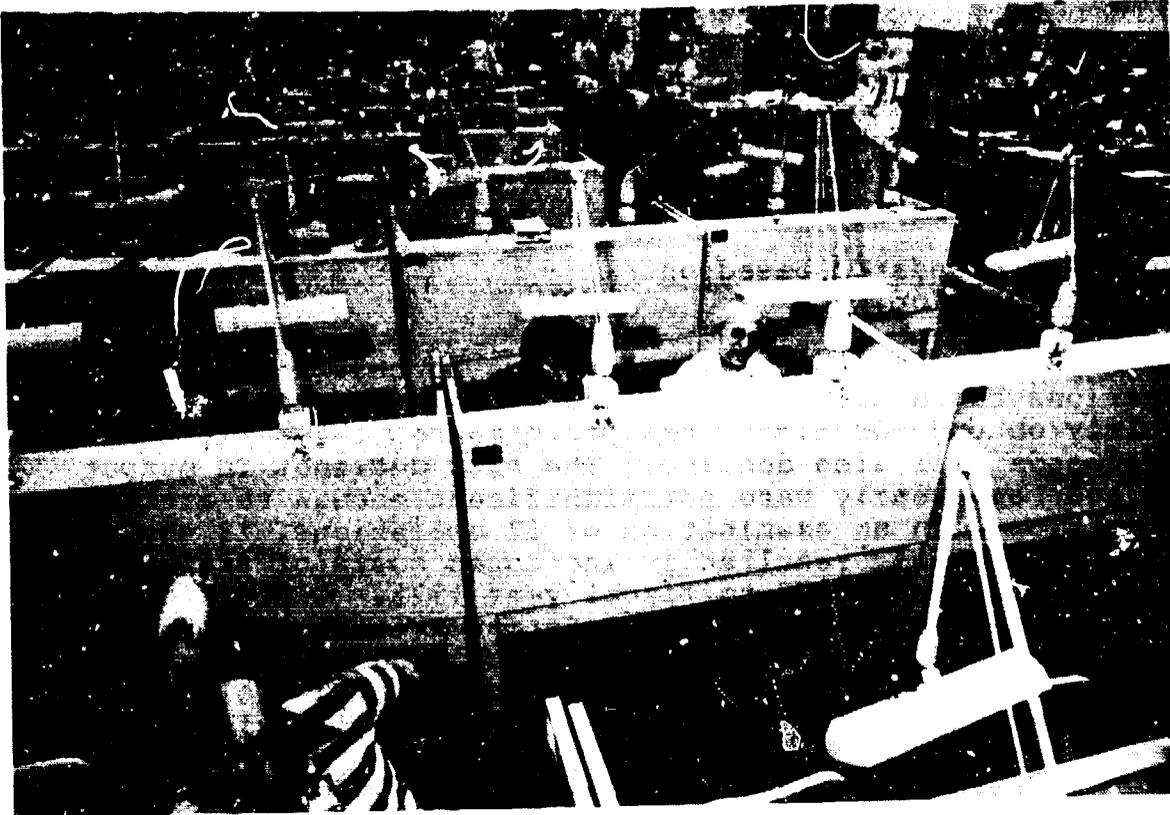
Substantial savings could result from (1) increasing the coverage of standards, (2) improving the accuracy of standards, (3) performing methods studies, and (4) improving the accuracy of production reports.

### Increasing coverage

GPO has two large sections of proofreaders: the Patents Section where the proofreaders are under a measured performance standard, and the Proof Section where the proofreaders are not under a similar standard. Both sections perform similar type work. Patents Section proofreaders generally achieve the managerial judgment standard of 10,000 ems an hour. Ems is a generally accepted measure of type in a line. During fiscal year 1976, the Patents Section proofreaders averaged 10,619 ems an hour. We calculated the Proof Section's ems an hour and found that they read at a rate of 9,236 ems an hour, or 15 percent less than the Patents Section. We estimate that fiscal year 1976 proofreading costs would have been reduced by over \$400,000 if the Proof Section proofreaders performed at the Patents Section rate.

According to GPO officials, the standard for the Patents Section could be applied to the Proof Section. The officials said they had not done this because of the cost of increasing the size of the organization which performs the clerical operations necessary to compute proofreaders performance. Determining performance and comparing it to the standard is necessary to ascertain whether the standard is being complied with. After viewing our analysis, the officials stated that they planned to extend standards coverage to all proofreaders in the Proof Section.

We did not find other major sections without standards for their primary operations. GPO's labor standards cover about 60 percent of all production labor hours; however, we recognize that 100 percent coverage by standards is generally impractical.



Main Proof Section of the Government Printing Office. The two-man team in the foreground is proof-reading Congressional work.

### Accuracy of standards based on historical performance

Most GPO binding and press division's standards are established through analysis of historical performance on each operation.

We evaluated these standards by comparing GPO's standards to the Printing Industries of America (PIA) standards. PIA is a nationwide printing industry organization which develops standards based on the output experience of many of its members. We found that most of GPO's composing machine performances and printing press performances were in line with PIA standards.

We also examined certain bindery standards for which no equivalent standards were available from PIA. We examined GPO's methods of computing these historical performance based standards and found that the standards are periodically changed.

Each year the average output an hour for each operation is determined by dividing that year's production output by the hours spent on the operation. Periodically the standard is recomputed by taking an average of 3 of the last 5 years annual outputs an hour (the high and low years are not included in the computations).

Updating standards based on changing performance

We found instances where output an hour in certain operations had declined and, because the standards are based solely on updated historical performance, the newly computed standards will also decline. The slow declines in output an hour ; arently were not significant enough to attract attention. In an examination of 17 operations, 13 showed a slow decline and resulted in increased costs of \$86,729 from fiscal year 1972 to fiscal year 1975. GPO officials believe that some change in performance is caused by recent reductions in order quantities, which tend to increase the number of setups and decrease production. The following chart demonstrates some of these operations' decline.

Declining Performance in Bindery Operations

<u>Operation</u>	<u>1972 output an hour</u>	<u>1975 output an hour</u>	<u>Percent decline</u>
Casing in cased work 6-1/2" x 9-1/2" and smaller	364	299	17.9
Stamping--ink and blank rigid cases	925	781	15.6
Rounding, backing, headbanding, and lining	1,058	930	12.1
Folding, 32 pages over 6-1/2" x 9-1/2"	2,154	1,917	11.0
Folding, 64 pages up to 6-1/2" x 9-1/2"	2,382	2,173	8.8
Stamping--gold rigid cases	975	891	8.6



**Bindery workers loading rotary gathering boxes on the adhesive binder and checking for the proper gathering sequence.**

### Methods studies not performed

Because of declines in output per staff-hour in various GPO operations, we discussed with GPO officials the use of methods studies as a means of establishing standard and efficient job designs. According to these officials, labor standards had been established without performing such studies. According to these officials, sufficient staff has not been available to perform such studies.

### Overstated production reports for proofreaders

We also examined the method of measuring the production output of the proofreaders and determined that extra allowances were unnecessarily given to the proofreaders. In some cases proofreaders' outputs were erroneously inflated. This occurred because extra difficulty allowances for typesetters were written on the proof copy used for computing output for both compositors and proofreaders. Measurement clerks did not know when to add the allowances only to the compositors' outputs.

GPO management officials said they were not aware of this error in production measuring and that the clerks would be instructed as to proper counting of production output.

### CONCLUSIONS

GPO has performance standards covering about 60 percent of the production labor hours expended. However, GPO can obtain benefits by increasing the number of operations covered by standards. If proofreading in the Proof Section is performed under the same standards as the Patents Section, cost savings may be as much as \$400,000 a year.

Work measurement methods can be improved by (1) eliminating the practice of continuously updating standards based solely on output changes and (2) performing methods analysis before measuring the work.

Performance reporting can be improved by insuring that all production outputs are correctly counted by work measurement clerks.

### RECOMMENDATIONS

The Public Printer should increase the coverage of important operations under standards, improve the quality of

the standards, and assure the accuracy of production output reporting by

- extending the same proofreading standards to all proofreaders,
- analyzing methods before establishing standards,
- eliminating the practice of updating the standards based solely on continually changing historical experience, and
- making sure that all production work is correctly counted.

#### AGENCY COMMENTS AND OUR EVALUATION

The Deputy Public Printer stated that the same proofreading standards have now been applied to all proofreaders, and that historical experience coupled with methods analysis will be used in updating and establishing standards. Further, clerks have now been instructed as to the proper counting of production output.

We agree with the actions taken by GPO, and believe that if its plans are properly followed, they will result in better productivity controls.

## CHAPTER 6

### OBSERVATIONS ON SPOILAGE CONTROLS

In any operation where materials are used, spoilage controls are a method of reducing costs. All printers incur spoilage during the printing process. Spoilage, as defined by the National Association of Printers and Lithographers, is:

"\* \* \* the result of an error in judgement and/or performance, whether that error be of omission or commission. The cost value of spoilage consists of all remedial expenditures for materials, labor and factory overhead, that are necessary to correct the error and produce a saleable job. Spoilage costs are totally unpredictable, and by nature must be absorbed by the printer."

During fiscal year 1975 GPO recorded \$576,693 in spoilage costs. GPO's spoilage costs have been increasing each year. The spoilage cost for fiscal year 1975 is an increase of 57.5 percent over fiscal year 1972.

An effective spoilage control requires a reporting system which includes all spoilage and their causes and points out recurring causes of spoilage. This allows management to examine the causes and to take corrective actions when possible.

#### GPO SPOILAGE REPORTING SYSTEM

When an order is planned, the amount of paper stock required, including a standard allowance for material normally wasted in setting up operating equipment, is computed. After the order is placed in production, the planned quantity of paper is issued. If the total paper needed exceeds the planned quantity, a spoilage report is prepared. The spoilage report directs the submitter to describe the nature of the spoilage, the cause of the spoilage, and recommendations to prevent its recurrence. The report is then sent to the Production Manager's office and a determination is made either to issue more paper to complete the order or to obtain agreement from the customer to reduce the quantity.

#### GPO IS NOT FULLY USING THE REPORTING SYSTEM

In examining GPO's spoilage reporting system, we found that GPO management could more fully use the reporting system to identify quantities and causes of spoilage.



A battery of small presses, used for printing short runs by the offset process. Each time a new order is started some material is lost in setting up the press.

### Spoilage reports not prepared

While spoilage reporting is used on agency work, we found that it is not used on most congressional orders. The spoilage reporting system is used primarily to obtain more material, and because congressional orders are considered high-priority work with fixed quantity requirements, a shortage in material almost always requires immediately issuing more paper. Consequently, the urgency of the order causes extra paper to be issued for congressional spoilage without preparing a spoilage report.

### Spoilage causes are not identified

GPO uses spoilage reports as a means of distributing the spoilage costs to the various divisions, but not as a method of analyzing causes of spoilage. An examination of spoilage reports gave vague causes for most spoilage, such as either short from press or difficulties in binding. No specifics were given and GPO officials said no follow up was taken.

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We suggested GPO management use the spoilage reporting system to at least report the amount and cause of spoilage on congressional orders. With this information, management will be better able to identify causes of spoilage.

To help reduce spoilage costs, we also suggested that GPO make greater use of spoilage reports by requiring more explicit information, such as the exact cause and equipment being used. In this way, recurring causes of spoilage can be identified and avoidable spoilage can be highlighted and appropriate action taken.

The Deputy Public Printer stated that GPO will continue to strive to reduce spoilage. The Quality Control and Technical Department has been assigned to identify and establish procedures for reducing shortages which are the major source of spoilage. Spoilage reports will be analyzed to record and identify areas where spoilage can be controlled.

We believe these steps will make greater use of spoilage data and should help to reduce the causes of spoilage.

DESCRIPTION OF GPO'S WORKLOAD

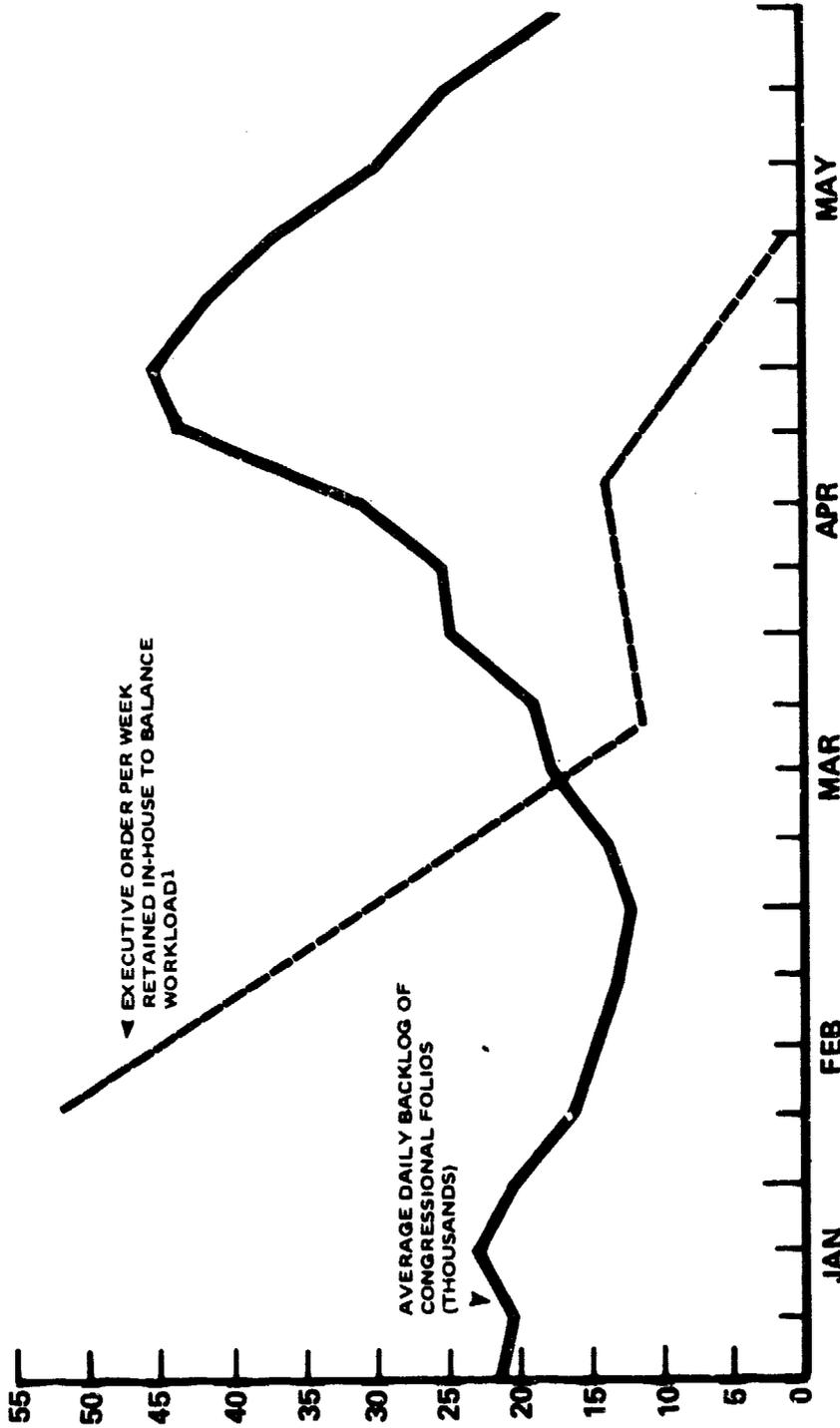
Workload received from the Congress is predominately straight text, produced in coverless or soft-cover book and pamphlet type documents; for example, the Congressional Record and committee hearings. Workload levels for straight text are estimated by using a printer's measure of pages of draft manuscript called "folios."

Workload received from executive agencies varies widely in nature, including hard- and soft-cover books, pamphlets, single and multiple forms, and envelopes. Consequently, the overall level of agency work is only measured in number of orders.

The congressional folio count over the 6-month period from January through June 1976, shown on the following chart, demonstrates the fluctuations in congressional workload. The chart also shows the executive agency workload retained in-house for balancing and Customer Service's reduction of this workload as congressional work increased.

From January to June 1976, during four periods of about 5 days each, 436 executive agency orders were kept in-house. These orders were identified by the Customer Service Department, as required, either to balance low workload or to be kept in-house for other reasons.

# GPO IN-HOUSE PRODUCTION



<sup>1</sup> EXECUTIVE ORDERS WERE REPORTED FOR FOUR PERIODS. THREE PERIODS WERE OF ONE WEEK. PERIOD NUMBER 2, IN MARCH, WAS LESS THAN ONE WEEK & THEREFORE WAS ADJUSTED TO APPROXIMATE A FULL WEEK. THE DIFFERENT HANDLING OF THIS PERIOD MAY ACCOUNT FOR THE DEVIATION OF THIS PERIOD FROM THE GENERAL TREND.

**PRINCIPAL OFFICIALS**  
**RESPONSIBLE FOR ACTIVITIES**  
**DISCUSSED IN THIS REPORT**

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
<b>PUBLIC PRINTER:</b>		
Thomas F. McCormick	Mar. 1973	Present
Harry J. Humphrey (acting)	Jan. 1972	Feb. 1973
<b>DEPUTY PUBLIC PRINTER</b>		
<b>(OPERATIONS):</b>		
John J. Boyle	June 1973	Present
Leonard T. Golden (acting)	May 1972	June 1973
<b>PRODUCTION MANAGER:</b>		
Samuel L. Saylor, Jr.	July 1975	Present
Edward F. Rothman	July 1973	June 1975
Leonard T. Golden	Dec. 1972	June 1973